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ABSTRACT

The "Survey of Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996" collected information from 911 regular United States public elementary and secondary schools regarding the availability and use of advanced telecommunications, and in particular, access to the Internet, plans to obtain Internet access, use of advanced telecommunications by schools and teachers, and sources of support for advanced telecommunications in schools. This report presents selected data from the survey. Major findings of the survey include: (1) 65% of schools had Internet access; (2) 61% of elementary and 77% of secondary schools had Internet access; (3) large schools were more likely to have Internet capabilities than smaller schools; (4) suburban schools reported higher rates of Internet access than schools in rural areas or towns; (5) schools with high levels of students in poverty were less likely to be connected to the Internet; (6) 87% of schools without Internet access plan to have access by the year 2000, resulting in 95% of schools expecting to have Internet access by the year 2000; (7) 14% of all public school instructional rooms were connected to the Internet; (8) schools with Internet access varied in the number of rooms equipped with Internet capabilities, from one to more than five; (9) 20% of all teachers used advanced telecommunications for teaching; (10) 13% of schools have mandated advanced telecommunications training for teachers, 31% provide incentives for training, and 51% rely on teacher-initiated participation; and (11) funds from the school district support advanced telecommunications for 83% of schools. Data tables and standard error tables are provided. (Author/SWC)

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Statistics in Brief

February 1997

Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996

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The *Survey of Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996* requested information regarding the availability and use of advanced telecommunications in regular public schools and, in particular, access to the Internet, plans to obtain Internet access, use of advanced telecommunications by schools and teachers, and sources of support for advanced telecommunications in schools. Major findings of the survey are as follows:

- Sixty-five percent of U.S. public schools had access to the Internet in fall 1996 (table 1). This represented a gain of 15 percentage points in each of the last two consecutive years.
- While 61 percent of all public elementary schools had Internet access, about three-fourths (77 percent) of secondary schools had Internet access (table 1).
- Large schools were more likely to have Internet capabilities than their smaller counterparts. Eighty percent of public schools with 1,000 or more students had Internet access compared with 57 percent of schools with fewer than 300 students and 66 percent of schools enrolling between 300 and 999 students (table 1).
- Urban fringe (or suburban) schools reported higher rates of Internet access than schools in rural locales or towns. Seventy-five percent of urban fringe schools were connected to the Internet, compared with 60 percent for rural schools and 61 percent for schools in towns (table 1).
- Public schools with high levels of students in poverty were less likely to be connected to the Internet. Internet access was available in about half (53 percent) of schools in which 71 percent or more students were eligible for the free or reduced-price lunch program and in 58 percent of those in which 31 to 70 percent of students were eligible.

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In comparison, 72 percent of schools with 11 to 30 percent student eligibility for the lunch program had Internet access and 78 percent of those with less than 11 percent free or reduced-price lunch eligibility were connected to the Internet (table 1).

- Eighty-seven percent of public schools that did not have access to the Internet had plans to obtain access by the year 2000 (table 2). Thus, 95 percent of the nation's public schools were expecting to obtain Internet access by the end of the century (figure 3).
- In fall 1996, 14 percent of all public school instructional rooms (classrooms, computer or other labs, and library media centers) were connected to the Internet (table 1). This was more than a fourfold increase since fall 1994, when 3 percent of all instructional rooms had access to the Internet.
- In 5 percent of public schools on the Internet, Internet access capabilities were not installed in instructional rooms (including classrooms, computer or other labs, and library media centers). Forty-three percent of schools with Internet access provided this access in one instructional room (figure 2). Twenty-two percent had access in two or three rooms, 4 percent reported four rooms, and 25 percent were connected to the Internet in five or more instructional rooms.
- Among all public schools, 20 percent of teachers used advanced telecommunications for teaching (table 5).
- Thirteen percent of all public schools reported that training for teachers in advanced telecommunications was mandated by the school, district, or teacher certification agencies (table 6). Thirty-one percent of schools indicated that incentives were provided to encourage teachers to obtain advanced telecommunications training, while in about half (51 percent) of the nation's public schools it was left up to teachers to initiate participation in advanced telecommunications training.
- Support for advanced telecommunications in all public schools was most frequently provided by local school districts. Eighty-three percent of public schools reported that the school district provided funds for advanced telecommunications (table 7). Funds from state or federal government agencies helped support advanced telecommunications in 38 percent of public schools, and 18 percent reported that parents or other community members provided monetary support for the schools' advanced telecommunications.

The National Information Infrastructure (NII) initiative, set forth by the President, encourages an acceleration of the goal to connect all of the nation's schools and classrooms, as well as libraries, hospitals, and law enforcement agencies, to the "Information Superhighway." In response to this federal goal, the U.S. Department of Education has commissioned three surveys to obtain data on the status of advanced telecommunications in public elementary and secondary schools. The first obtained baseline data in fall 1994 against which future change could be measured. A followup survey was conducted in fall 1995 and because the status of advanced telecommunications is changing rapidly, a third study, the *Survey of Advanced Telecommunications in U.S. Public Schools, Fall 1996*, was conducted for the National Center for Education Statistics (NCES) through its Fast Response Survey System (FRSS).

This report presents selected data from the fall 1996 survey; the data were collected from 911 regular public elementary and secondary schools and were weighted to produce national estimates for all regular public schools. Special education, vocational education, and alternative schools were not included in the study. Data presented include the prevalence of Internet access in public schools, the types of Internet capabilities schools make available, use of

advanced telecommunications by schools and teachers, and sources of support for advanced telecommunications in schools. Future reports will provide additional study findings, including barriers to the use of advanced telecommunications for students with disabilities.

Internet Access in Schools

Overall, 65 percent of public schools had Internet access during fall 1996 (table 1). This number represents all schools that had any access to the Internet.

Table 1.—Percent of all public schools and the percent of all public school instructional rooms with Internet access in fall 1994, fall 1995, and fall 1996, by school characteristics

School characteristic	Percent of schools with Internet access			Percent of instructional rooms with Internet access[1]		
	1994	1995	1996	1994	1995[2]	1996
All public schools	35	50	65	3	8	14
Instructional level[3]						
Elementary	30	46	61	3	8	13
Secondary	49	65	77	4	8	16
Size of enrollment						
Less than 300	30	39	57	3	9	15
300 to 999	35	52	66	3	8	13
1,000 or more	58	69	80	3	4	16
Metropolitan status						
City	40	47	64	4	6	12
Urban fringe	38	59	75	4	8	16
Town	29	47	61	3	8	14
Rural	35	48	60	3	8	14
Geographic region						
Northeast	34	59	70	3	6	10
Southeast	29	44	62	2	5	10
Central	34	52	66	3	10	19
West	42	48	62	5	9	15
Percent minority enrollment						
Less than 6 percent	*	52	65	*	9	18
6 to 20 percent	*	58	72	*	10	18
21 to 49 percent	*	54	65	*	9	12
50 percent or more	*	40	56	*	3	5
Percent of students eligible for free or reduced-price school lunch						
Less than 11 percent	*	62	78	*	9	18
11 to 30 percent	*	59	72	*	10	16
31 to 70 percent	*	47	58	*	7	14
71 percent or more	*	31	53	*	3	7

*Data not available.

[1]The percent of instructional rooms across the country is based upon the total number of instructional rooms (e.g., classrooms, computer labs, library/media centers) in all regular public elementary and secondary schools.

[2]Data for the percentage of all instructional rooms across the country with Internet access in 1995 was previously reported as 9 percent. Subsequent checking found that the correct number for 1995 is 8 percent.

[3]Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Advanced Telecommunications in Public Schools, K-12," FRSS 51, NCES 95-731; "Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, 1995," FRSS 57, NCES 96-854; "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

School access to the Internet has increased by 15 percentage points for the second consecutive year. In 1994, when data were first collected, 35 percent of public schools were connected to the Internet (table 1). This increased to 50 percent by 1995 and rose again in 1996 to the current level.

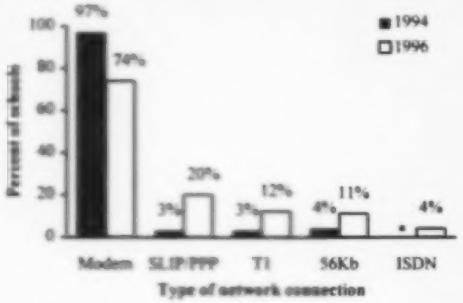
Differences in Internet access in fall 1996 were found among schools by instructional level, size of enrollment, metropolitan status, and poverty level of students' families. While 61 percent of public elementary schools had Internet access, about three-quarters (77 percent) of public secondary schools were connected to the Internet. Schools with enrollments of 1,000 or more students were more likely to be connected to the Internet than their smaller counterparts. Eighty percent of large schools were connected to the Internet, compared with 66 percent of schools enrolling 300 to 999 students and 57 percent of those with fewer than 300 students.

Urban fringe (or suburban) schools reported higher rates of Internet access than those in towns or rural areas. Seventy-five percent of public schools in urban fringe areas had Internet access compared with 61 percent in towns and 60 percent of schools located in rural areas.

School access to the Internet was examined by the level of poverty in the school as defined by the proportion of students eligible for the free or reduced-price lunch program. Schools with higher proportions of students eligible for the free or reduced-price lunch program were less likely to have Internet access than those with smaller percentages of students eligible for this program. About half (53 percent) of schools in which 71 percent or more students were eligible for the free or reduced-price lunch program had Internet access and 58 percent of those schools with 31 to 70 percent of eligible students had Internet access. In comparison, about three-fourths (72 to 78 percent) of schools with smaller proportions of students eligible for free or reduced-price lunch had Internet access.

Schools connect to the Internet in a variety of ways. Although modems remained the most common means of connection, use of higher speed connections had increased since 1994. In fall 1996, 74 percent of schools with Internet were connected by modem (figure 1). Twenty percent used higher speed SLIP or PPP connections, 12 percent had a T1 connection, 11 percent had a 56Kb connection, and 4 percent connected to the Internet with an ISDN. This represents a change from 1994 when data were first collected. In 1994, 97 percent of schools with Internet connected by modem; 3 to 4 percent used each type of high speed connection such as a SLIP/PPP (3 percent), T1 (3 percent), or 56Kb (4 percent).

Figure 1.--Percent of public schools with Internet access, by type of network connection: Fall 1996



*Data not collected in 1994.

NOTE: The percents of public schools with each type of connection are based upon schools with Internet access--65 percent of public schools in 1996 and 35 percent of public schools in 1994. Percents do not sum to 100 because some schools had more than one type of connection.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

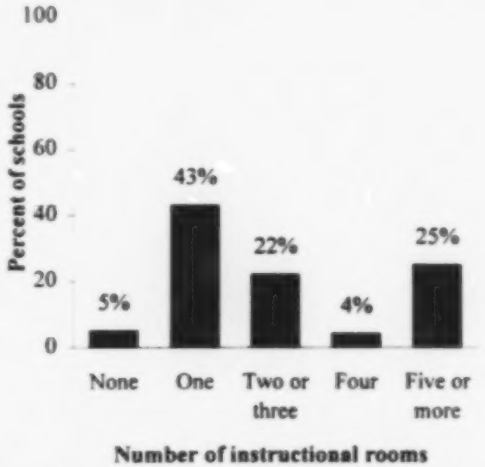
Internet Access in Instructional Rooms

In addition to Internet access at the school building level, the survey collected information regarding the percentage of instructional rooms including classrooms, computer or other labs, school libraries, and media centers that had Internet access. Overall, while 65 percent of schools were on the Internet, 14 percent of all instructional rooms in U.S. public schools had Internet access. This percentage has grown by 5 to 6 percentage points annually since fall 1994 when 3 percent of instructional rooms were on the Internet (table 1).

The percentage of rooms with Internet access differed by percent minority enrollment and poverty of the school. While schools with minority enrollments of 20 percent or less reported Internet access in 18 percent of their instructional rooms, those with minority enrollments of 50 percent or more had access in 5 percent of their instructional rooms. Instructional rooms in schools with the highest level of student poverty (71 percent or more) were about half as likely to have Internet access (7 percent) as schools with lower levels of poverty (14 to 18 percent).

Of the schools with Internet access, 95 percent indicated that they had Internet access in at least one instructional room such as a classroom, computer or other lab, or library media center (figure 2). Forty-three percent reported access in one instructional room, 22 percent had Internet access in two or three instructional rooms, 4 percent reported access in four instructional rooms, and 25 percent had Internet access in five or more rooms.

Figure 2.--Percent of public schools with Internet access, by the number of instructional rooms with access: Fall 1996



NOTE: Percents do not sum to 100 because of rounding and percents with Internet access in one or more instructional rooms do not sum to 95 because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Future Plans for Internet Access

Among schools that do not currently have Internet access (35 percent of all schools), 87 percent have plans to obtain access to the Internet in the future (table 2). Seventy-four percent of schools either had Internet access or indicated that they planned to obtain Internet access by the end of 1997 (figure 3). All but 5 percent of public schools had or were planning to connect to the Internet by the year 2000.

No significant differences in plans for obtaining Internet access were found by school poverty level. However, schools with larger proportions of students in poverty had lower current levels of Internet connectivity. Proportionately, almost twice as many schools in which over 30 percent of students were eligible for school lunch programs (42 to 47 percent) as schools with lower levels of poverty (22 to 28 percent) did not already have access to the Internet (table 2). Thus, higher proportions of these schools

Table 2.--Percent of public schools that do not currently have access to the Internet and their plans to obtain access to the Internet, by school characteristics: Fall 1996

School characteristic	No current Internet access	Planning Internet access by year 2000[1]	No plans for future Internet access
All public schools	35	87	13
Instructional level[2]			
Elementary	39	85	15
Secondary	23	93	7
Size of enrollment			
Less than 300	43	83	17
300 to 999	34	88	12
1,000 or more	20	87	13
Metropolitan status			
City	36	84	16
Urban fringe	25	87	13
Town	39	88	12
Rural	40	87	13
Geographic region			
Northeast	30	94	6
Southeast	38	90	10
Central	34	77	23
West	38	89	11
Percent minority enrollment			
Less than 6 percent	35	86	14
6 to 20 percent	28	88	12
21 to 49 percent	35	95	5
50 percent or more	44	78	22
Percent of students eligible for free or reduced-price school lunch			
Less than 11 percent	22	88	12
11 to 30 percent	28	92	8
31 to 70 percent	42	84	16
71 percent or more	47	85	15

[1]Schools reported whether they had plans to obtain access to the Internet. All schools reporting that they did have plans to obtain Internet access planned to obtain access by the year 2000.

[2]Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

NOTE: The percents of schools with and without plans for future Internet access are based upon schools with no current Internet access--35 percent of public schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

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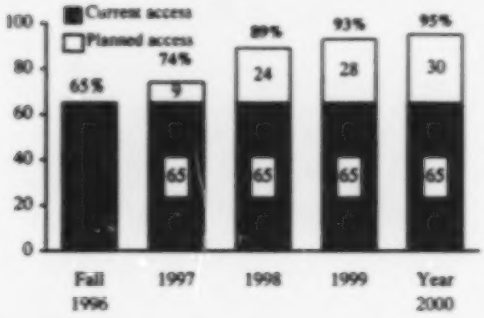
must become connected if they are to equalize access for students in poverty.

Figure 3.--Percent of all public schools having or expecting Internet access between fall 1996 and the year 2000



SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Type of Internet Capabilities Available

Ninety percent of schools with Internet access had e-mail and 89 percent had access to the World Wide Web (table 3). Ninety-four percent of schools with World Wide Web access made it available to teachers, 86 percent made it available for administrative staff, and 74 percent made it available to students.

While most schools on the Internet provided teachers and staff access to e-mail, about a third (35 percent) made it available for student use.

Advanced Telecommunications

In addition to information obtained specifically about the Internet, all schools were asked about the use of advanced telecommunications in general. *Advanced telecommunications*, while including the Internet, refers more broadly to all modes of communication used to transmit information from one place to another including broadcast and interactive television, two-way video, and networked computers (both local and wide area networks). With the exception of the Internet, access to other advanced telecommunications capabilities were relatively unchanged since 1994 (unpublished tabulations). Schools provided information about the use of these telecommunications by schools and teachers, training for teachers, and various sources of support for advanced telecommunications in schools.

Table 3.--Percent of public schools having access to the Internet, by various types of Internet capabilities and members of the school community having access to the capability: Fall 1996

Internet capability	Available[1]	Members of school community with access to capability[2]		
		Administrative staff	Teachers	Students
E-mail	90	92	88	35
News groups	57	85	91	43
Resource location services (e.g., Gopher, Archie, Veronica, etc.)	67	87	93	64
World Wide Web Access (e.g., browsers, such as Netscape, MOSAIC)	89	86	94	74

[1]Percents in this column are based upon the number of schools having access to the Internet--65 percent of public schools.

[2]Percents in these columns are based upon the number of schools with the corresponding Internet capability.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Uses of Advanced Telecommunications by Schools and Teachers

Seventy-four percent of schools used advanced telecommunications (including but not limited to the Internet) to access information (table 4). Sixty-seven percent of schools used advanced telecommunications for record keeping within schools or school districts. About one-fifth of schools used advanced telecommunications to communicate with parents or for distance learning (22 percent for each).

Table 4.--Percent of all public schools using advanced telecommunications in selected ways, by school characteristics: Fall 1996

School characteristic	Use of advanced telecommunications[1]			
	To access information	For record keeping within school or school district	To communicate with parents	For distance learning
All public schools	74	67	22	22
Instructional level[2]				
Elementary	71	66	22	19
Secondary	84	68	21	33
Size of enrollment				
Less than 300	65	56	19	22
300 to 999	76	69	22	21
1,000 or more	83	80	29	33
Metropolitan status				
City	72	70	26	22
Urban fringe	81	71	25	19
Town	72	66	23	20
Rural	71	60	16	29
Geographic region				
Northeast	72	59	18	17
Southeast	79	75	27	29
Central	77	60	22	22
West	69	72	21	22
Percent minority enrollment				
Less than 6 percent	74	55	17	23
6 to 20 percent	79	72	23	23
21 to 49 percent	72	66	27	27
50 percent or more	71	78	23	17
Percent of students eligible for free or reduced-price school lunch				
Less than 11 percent	78	62	25	25
11 to 30 percent	75	62	20	24
31 to 70 percent	72	68	21	22
71 percent or more	71	77	25	17

[1]Advanced telecommunications includes all modes of communications technology used to transmit information from one place to another including local and wide area computer networks (including the Internet); broadcast, cable, and interactive television; one-way video with two-way audio or computer link; two-way video; etc. Advanced telecommunications do not include standard telephone and fax capabilities.

[2]Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Schools also reported the proportions of teachers in the school regularly using any advanced telecommunications for teaching, professional development, or curriculum development. Twenty percent of public school teachers were using advanced telecommunications for teaching, 16 percent for professional development, and 15 percent for curriculum development (table 5).

Table 5.--Percent of teachers in all public schools regularly using advanced telecommunications for teaching, professional development, and curriculum development, by school characteristics: Fall 1996

School characteristic	Teachers using advanced telecommunications[1] for:		
	Teaching	Professional development	Curriculum development
All public schools	20	16	15
Instructional level[2]			
Elementary	22	17	15
Secondary	18	15	14
Size of enrollment			
Less than 300	20	15	16
300 to 999	22	17	15
1,000 or more	16	14	14
Metropolitan status			
City	18	15	15
Urban fringe	20	17	14
Town	23	16	15
Rural	20	17	16
Geographic region			
Northeast	19	16	13
Southeast	23	16	14
Central	19	17	15
West	20	15	17
Percent minority enrollment			
Less than 6 percent	22	17	16
6 to 20 percent	19	15	16
21 to 49 percent	21	17	15
50 percent or more	19	14	13
Percent of students eligible for free or reduced-price school lunch			
Less than 11 percent	20	17	16
11 to 30 percent	20	16	15
31 to 70 percent	22	16	15
71 percent or more	20	15	14

[1]Advanced telecommunications includes all modes of communications technology used to transmit information from one place to another including local and wide area computer networks (including the Internet); broadcast, cable, and interactive television; one-way video with two-way audio or computer link; two-way video; etc. Advanced telecommunications do not include standard telephone and fax capabilities.

[2]Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

These percentages showed very little variation across school characteristics. Rather, there seemed to be a core of teachers, in very diverse schools, using advanced telecommunications.

Teacher Training

Teacher training in advanced telecommunications was mandated by the school or district or required by teacher certification agencies in 13 percent of schools, while in about half of schools it was left up to teachers to initiate participation in advanced telecommunications training (51 percent; table 6). Thirty-one percent of schools offered incentives to encourage teachers to participate in advanced telecommunications training.

Support for Advanced Telecommunications in Schools

Across various types of support, local school districts were the most frequently reported source of support for advanced telecommunications. In terms of funds, 83 percent of schools indicated that they received funds from the school district, 38 percent obtained funding from state or federal government agencies, and 18 percent reported that parents or other community members supported advanced telecommunications in the school with funds (table 7). Teachers provided advanced telecommunications training in 28 percent of schools and technical assistance in 24 percent of schools.

Summary

Considerable progress has been made in connecting all public schools to the Internet. By fall 1996, 65 percent of all regular public schools were already connected; an additional 30 percent reported that they planned to have Internet access by the year 2000. However, connecting schools is only part of the equation. Although Internet access in instructional rooms in public schools more than quadrupled between fall 1994 and fall 1996 (from 3 percent to 14 percent of all instructional rooms), the actual percentage of instructional rooms with Internet access remains low. Student access to the Internet is another part of the equation, but one about which little is known.

Although the surveys included in this report focused on regular public schools, the National Center for Education Statistics has collected information on Internet access in private schools through a fall 1995 FRSS survey. A report of the findings from that survey will be released shortly. National data regarding Internet access in special types of public schools (special education, vocational education, and alternative schools), however, have not been collected.

In addition to tracking the rate at which schools and instructional rooms have access to the Internet, the *Survey on Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996* gathered data regarding what other kinds of advanced telecommunications are available in schools, types of teacher training in advanced telecommunications provided by schools and school districts, and barriers to the use of schools' advanced telecommunications resources by students with disabilities. These issues will be examined in forthcoming NCES reports, scheduled for release later in 1997.

Table 6.--Percent of all public schools in which advanced telecommunications training for teachers is mandated, encouraged by incentives, left up to teachers to initiate, or described in some other way, by school characteristics: Fall 1996

School characteristic	Advanced telecommunications[1] training for teachers is:			
	Mandated by school or district or by teacher certification agencies	Encouraged by incentives	Left up to teachers to initiate participation	Other
All public schools	13	31	51	4
Instructional level[2]				
Elementary	13	31	51	4
Secondary	11	32	53	4
Size of enrollment				
Less than 300	11	32	51	7
300 to 999	14	31	52	3
1,000 or more	9	34	53	4
Metropolitan status				
City	7	30	59	4
Urban fringe	13	39	46	2
Town	19	26	52	3
Rural	13	30	50	8
Geographic region				
Northeast	8	37	51	3
Southeast	22	29	45	4
Central	11	34	50	5
West	11	27	57	5
Percent minority enrollment				
Less than 6 percent	11	33	50	5
6 to 20 percent	15	35	47	3
21 to 49 percent	15	29	52	4
50 percent or more	11	26	59	4
Percent of students eligible for free or reduced-price school lunch				
Less than 11 percent	14	38	44	4
11 to 30 percent	11	39	45	5
31 to 70 percent	15	24	58	3
71 percent or more	11	29	57	3

[1]Advanced telecommunications includes all modes of communications technology used to transmit information from one place to another including local and wide area computer networks (including the Internet); broadcast, cable, and interactive television; one-way video with two-way audio or computer link; two-way video; etc. Advanced telecommunications do not include standard telephone and fax capabilities.

[2]Data for combined schools are not reported as a separate instructional level because there were very few in the sample. Data for combined schools are included in the totals and in analyses by other school characteristics.

NOTE: Percents may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

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Table 7.--Percent of all public schools by sources of support for advanced telecommunications in the schools: Fall 1996

Organization	Support for advanced telecommunications*					
	Funds	Hardware	Software	Training	Technical assistance	Network access
School district	83	76	74	76	73	57
College or university	1	2	2	12	6	7
Business or industry	10	13	9	5	7	4
State or federal government agencies	38	18	15	17	12	11
Other community nonprofit organizations (e.g., libraries, museums)	6	4	4	3	3	3
Teachers	6	6	11	28	24	4
Students	1	1	2	3	5	1
Parents or other community members	18	14	11	4	11	1
Other	1	1	1	1	1	1

*Advanced telecommunications includes all modes of communications technology used to transmit information from one place to another including local and wide area computer networks (including the Internet); broadcast, cable, and interactive television; one-way video with two-way audio or computer link; two-way video; etc. Advanced telecommunications do not include standard telephone and fax capabilities.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Technical Notes

The sample of elementary and secondary schools for the FRSS survey on advanced telecommunications was selected from the 1993-94 NCES Common Core of Data (CCD) Public School Universe File. Over 84,000 public schools are contained in the CCD public school universe file. For this survey, elementary and secondary schools were selected. Special education, vocational education, and alternative schools were excluded from the survey along with schools that did not have at least first grade and those outside the 50 states and the District of Columbia.

A stratified sample of 1,000 schools was selected from the public school frame. To select the sample, the frame of schools was stratified by instructional level (elementary, secondary) and by geographic region (Northeast, Southeast, Central, and West). Within these primary strata, schools were also sorted by metropolitan status (city, urban fringe, town, rural), size of enrollment (less than 300, 300-499, 500-999, 1,000-1,499, 1,500 or more), and percent minority enrollment (less than 5 percent, 5-19.9 percent, 20-49.9 percent, 50 percent or more). The allocation of the sample to the major strata was made in a manner that was expected to be reasonably efficient for national estimates, as well as for estimates for major subclasses.

In September 1996, questionnaires were mailed to the principals in the 1,000 sampled schools. The principal was asked to forward the questionnaire to the computer or technology coordinator or to whomever was most knowledgeable about the availability and use of advanced telecommunications at the school. Telephone followup of nonrespondents was initiated in late October, and data collection was completed in November. Five schools were found to be closed, and a total of 911 schools

completed the survey. Thus, the final response rate was 92 percent (911 of 995 eligible schools).

The survey responses were weighted to produce national estimates. The weights were designed to adjust for the variable probabilities of selection and differential nonresponse. The findings in this report are estimates based on the sample selected and, consequently, are subject to sampling variability. The standard error is a measure of the variability of estimates due to sampling. It indicates the variability of a sample estimate that would be obtained from all possible samples of a given design and size. Standard errors are used as a measure of the precision expected from a particular sample. If all possible samples were surveyed under similar conditions, intervals of 1.96 standard errors below to 1.96 standard errors above a particular statistic would include the true population parameter being estimated in about 95 percent of the samples. This is a 95 percent confidence interval. For example, the estimated percentage of public schools with Internet access is 65 percent, and the estimated standard error is 1.8 percent. The 95 percent confidence interval for the statistic extends from 65 - (1.8 x 1.96) to 65 + (1.8 x 1.96), or from 61 to 69 percent. Estimates of standard errors for this report were computed using a technique known as the jackknife replication method. Standard errors for all of the estimates are presented in the tables. All specific statements of comparison made in this report have been tested for statistical significance using chi-square tests and t-tests adjusted for multiple comparisons using the Bonferroni adjustment and are significant at the 95 percent confidence level or better.

The survey estimates are also subject to nonsampling errors that can arise because of nonobservation (nonresponse or noncoverage) errors, errors of reporting, and errors made in collection of the data. These errors can sometimes bias the data. Nonsampling errors may include such problems as the differences in the respondents' interpretation of the meaning of the questions; memory effects; misrecording of responses; incorrect editing, coding, and data entry; differences related to the particular time the survey was conducted; or errors in data preparation. While general sampling theory can be used in part to determine how to estimate the sampling variability of a statistic, nonsampling errors are not easy to measure and, for measurement purposes, usually require that an experiment be conducted as part of the data collection procedures or that data external to the study be used. To minimize the potential for nonsampling errors, the questionnaire was pretested with public school technology coordinators and other knowledgeable respondents like those who completed the survey. During the design of the survey and the survey pretest, an effort was made to check for consistency of interpretation of questions and to eliminate ambiguous items. The questionnaire and instructions were extensively reviewed by the National Center for Education Statistics. Manual and machine editing of the questionnaire responses were conducted to check the data for accuracy and consistency. Cases with missing or inconsistent items were recontacted by telephone to resolve problems. Data were keyed with 100 percent verification.

The survey was performed under contract with Westat, Inc., using the NCES Fast Response Survey System (FRSS). Westat's Project Director was Elizabeth Farris, and the Survey Manager was Sheila Heaviside. Judi Carpenter, Shelley Burns, and Edith McArthur were the NCES Project Officers. The data were requested by Linda Roberts, U.S. Department of Education.

This report was reviewed by the following individuals:

Outside NCES

- Oona Cheung, Council of Chief State School Officers
- Douglas A. Levin, Pelavin Research Institute/American Institutes for Research
- David Osher, Pelavin Research Institute/ American Institutes for Research

Inside NCES

- Michael P. Cohen, Statistical Standards and Services Group
- Mary J. Frase, Data Development and Longitudinal Studies Group
- Gerald S. Malitz, Surveys and Cooperative Systems Group
- William H. Freund, Surveys and Cooperative Systems Group
- Kerry L. Gruber, Surveys and Cooperative Systems Group

For a copy of the questionnaire, *Advanced Telecommunications in U.S. Public Schools, Fall 1996*, or for more information about the Fast Response Survey System, contact Shelley Burns, Data Development and Longitudinal Studies Group, National Center for Education Statistics, Office of Educational Research and Improvement, 555 New Jersey Avenue, NW, Washington, DC 20208-5651, telephone (202) 219-1463. This and other NCES reports are available on the Internet at www.ed.gov/NCES/.

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U.S. Department of Education. 1995. *Advanced Telecommunications in U.S. Public Schools, K-12*, FRSS 51, NCES 95-731, Washington, DC: U.S. Government Printing Office.

U.S. Department of Education. 1996. *Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, 1995*, FRSS 57, NCES 96-854, Washington, DC: U.S. Government Printing Office.

Appendix

Standard Error Tables

Table 1a.--Standard errors of the percent of all public schools and the percent of all public school instructional rooms with Internet access in fall 1994, fall 1995, and fall 1996, by school characteristics

School characteristic	Percent of schools with Internet access			Percent of all instructional rooms with Internet access		
	1994	1995	1996	1994	1995	1996
All public schools	1.5	1.8	1.8	0.3	0.7	1.0
Instructional level						
Elementary	1.9	2.4	2.1	0.4	1.0	1.5
Secondary	2.4	2.7	1.8	0.6	1.0	1.5
Size of enrollment						
Less than 300	3.4	3.9	4.4	0.7	1.6	2.9
300 to 999	2.0	2.2	2.0	0.5	1.0	1.2
1,000 or more	3.0	4.1	3.4	0.6	1.0	2.1
Metropolitan status						
City	3.1	4.3	4.5	0.8	1.3	1.6
Urban fringe	2.9	3.8	3.3	0.8	1.4	2.2
Town	2.3	3.7	4.0	0.6	2.0	1.9
Rural	2.7	3.8	3.3	0.4	1.5	2.2
Geographic region						
Northeast	3.1	5.3	4.3	0.7	1.4	2.4
Southeast	3.1	5.3	4.0	0.3	1.5	1.7
Central	2.8	3.3	3.7	0.8	1.3	2.5
West	2.6	3.4	3.5	0.8	1.4	1.8
Percent minority enrollment						
Less than 6 percent	*	3.3	3.4	*	1.4	2.4
6 to 20 percent	*	4.4	3.0	*	1.5	2.2
21 to 49 percent	*	4.0	3.2	*	2.1	2.3
50 percent or more	*	3.8	4.6	*	1.0	1.5
Percent of students eligible for free or reduced-price school lunch						
Less than 11 percent	*	3.5	3.6	*	1.6	2.9
11 to 30 percent	*	3.6	3.1	*	1.8	2.0
31 to 70 percent	*	2.9	3.2	*	1.6	1.8
71 percent or more	*	4.3	5.2	*	0.9	1.6

*Data not available.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, 1995," FRSS 57, NCES 96-854; "Advanced Telecommunications in Public Schools, K-12," FRSS 51, NCES 95-731; "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

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Table 2a.--Standard errors of the percent of public schools that do not currently have access to the Internet and their plans to obtain access to the Internet, by school characteristics: Fall 1996

School characteristic	No current Internet access	Planning Internet access by year 2000	No plans for future Internet access
All public schools	1.8	2.1	2.1
Instructional level			
Elementary	2.1	2.5	2.5
Secondary	1.8	2.6	2.6
Size of enrollment			
Less than 300	4.4	4.4	4.4
300 to 999	2.0	2.5	2.5
1,000 or more	3.4	7.8	7.8
Metropolitan status			
City	4.5	5.4	5.4
Urban fringe	3.3	5.7	5.7
Town	4.0	4.1	4.1
Rural	3.3	4.2	4.2
Geographic region			
Northeast	4.3	4.3	4.3
Southeast	4.0	3.9	3.9
Central	3.7	5.2	5.2
West	3.5	3.3	3.3
Percent minority enrollment			
Less than 6 percent	3.4	3.8	3.8
6 to 20 percent	3.0	5.5	5.5
21 to 49 percent	3.2	2.9	2.9
50 percent or more	4.6	5.4	5.4
Percent of students eligible for free or reduced-price school lunch			
Less than 11 percent	3.6	7.0	7.0
11 to 30 percent	3.1	3.8	3.8
31 to 70 percent	3.2	3.7	3.7
71 percent or more	5.2	5.1	5.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Table 3a.--Standard errors of the percent of public schools having access to the Internet, by various types of Internet capabilities and members of the school community having access to the capability: Fall 1996

Internet capability	Available	Members of school community with access to capability		
		Administrative staff	Teachers	Students
E-mail	1.3	1.2	1.7	2.2
News groups	2.1	2.0	1.5	2.7
Resource location services (e.g., Gopher, Archie, Veronica, etc.)	2.4	1.6	1.3	2.4
World Wide Web Access (e.g., browsers, such as Netscape, MOSAIC)	1.6	1.4	1.2	2.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Table 4a.--Standard errors of the percent of all public schools using advanced telecommunications in selected ways, by school characteristics: Fall 1996

School characteristic	Use of advanced telecommunications			
	To access information	Record keeping within school or school district	To communicate with parents	For distance learning
All public schools	1.5	1.7	1.3	1.6
Instructional level				
Elementary	1.8	2.1	1.8	1.8
Secondary	1.8	2.1	1.8	3.0
Size of enrollment				
Less than 300	4.0	4.1	3.4	3.3
300 to 999	1.7	1.9	1.9	1.8
1,000 or more	2.9	3.4	3.7	4.0
Metropolitan status				
City	3.2	4.0	2.7	2.7
Urban fringe	2.9	3.4	2.9	3.2
Town	3.5	3.6	3.0	2.6
Rural	3.7	3.4	2.7	3.6
Geographic region				
Northeast	3.5	4.3	3.3	3.3
Southeast	3.2	3.4	3.4	3.7
Central	3.1	3.3	2.5	2.6
West	3.2	2.8	2.7	2.8
Percent minority enrollment				
Less than 6 percent	3.2	3.3	2.6	3.1
6 to 20 percent	3.1	3.4	2.9	3.2
21 to 49 percent	4.2	3.5	3.7	2.8
50 percent or more	3.5	3.4	3.2	3.3
Percent of students eligible for free or reduced-price school lunch				
Less than 11 percent	3.8	4.7	3.8	4.5
11 to 30 percent	3.4	3.7	2.6	3.3
31 to 70 percent	2.5	2.9	2.7	2.2
71 percent or more	4.4	4.5	4.3	3.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Table 5a.--Standard errors of the percent of teachers in all public schools regularly using advanced telecommunications for teaching, professional development, and curriculum development, by school characteristics: Fall 1996

School characteristic	Teachers using advanced telecommunications for:		
	Teaching	Professional development	Curriculum development
All public schools	1.0	0.9	0.8
Instructional level			
Elementary	1.3	1.1	1.0
Secondary	1.2	1.0	0.8
Size of enrollment			
Less than 300	2.3	2.0	2.2
300 to 999	1.3	1.1	1.0
1,000 or more	1.5	1.3	1.7
Metropolitan status			
City	2.2	1.8	2.0
Urban fringe	2.4	2.0	1.8
Town	2.1	1.6	1.7
Rural	1.8	1.7	1.9
Geographic region			
Northeast	2.6	2.6	2.4
Southeast	2.4	1.9	1.7
Central	1.7	1.8	1.5
West	1.8	1.4	1.6
Percent minority enrollment			
Less than 6 percent	1.7	1.5	1.5
6 to 20 percent	2.1	1.9	1.8
21 to 49 percent	2.3	1.9	1.6
50 percent or more	2.4	1.8	1.8
Percent of students eligible for free or reduced-price school lunch			
Less than 11 percent	2.6	2.6	2.4
11 to 30 percent	2.0	1.8	1.6
31 to 70 percent	1.8	1.7	1.4
71 percent or more	2.9	2.3	2.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Table 6a.--Standard errors of the percent of all public schools in which advanced telecommunications training for teachers is mandated, encouraged by incentives, left up to teachers to initiate, or described in some other way, by school characteristics: Fall 1996

School characteristic	Advanced telecommunications training for teachers is:			
	Mandated by school or district or by teacher certification agencies	Encouraged by incentives	Left up to teachers to initiate participation	Other
All public schools	1.3	1.7	1.9	0.7
Instructional level				
Elementary	1.6	2.1	2.3	0.9
Secondary	1.6	2.4	2.4	0.9
Size of enrollment				
Less than 300	2.4	3.3	3.1	2.1
300 to 999	1.7	2.4	2.7	0.8
1,000 or more	2.6	3.4	3.8	1.7
Metropolitan status				
City	2.2	3.7	4.2	1.5
Urban fringe	2.5	3.8	3.8	0.8
Town	2.4	3.5	4.3	1.3
Rural	2.2	3.1	3.6	2.2
Geographic region				
Northeast	2.7	4.9	5.0	1.5
Southeast	3.6	3.2	3.7	1.5
Central	2.1	3.4	3.4	1.6
West	2.1	3.2	3.2	1.4
Percent minority enrollment				
Less than 6 percent	2.2	3.3	3.2	1.5
6 to 20 percent	2.7	3.6	4.5	1.1
21 to 49 percent	3.0	3.9	4.4	1.8
50 percent or more	2.7	3.9	4.8	1.5
Percent of students eligible for free or reduced-price school lunch				
Less than 11 percent	2.8	4.9	4.4	1.8
11 to 30 percent	2.2	3.6	3.4	1.5
31 to 70 percent	2.5	2.2	3.2	1.2
71 percent or more	3.1	4.3	5.1	2.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Table 7a.--Standard errors of the percent of all public schools by sources of support for advanced telecommunications in the school: Fall 1996

Organization	Support for advanced telecommunications					
	Funds	Hardware	Software	Training	Technical assistance	Network access
School district	1.2	1.8	1.9	1.9	1.8	2.0
College or university	0.3	0.4	0.5	1.2	0.8	1.0
Business or industry	1.0	1.2	1.2	0.7	1.0	0.7
State or federal government agencies	1.9	1.6	1.3	1.3	1.1	1.2
Other community nonprofit organizations (e.g., libraries, museums)	0.9	0.8	0.8	0.6	0.6	0.3
Teachers	0.9	0.8	1.0	1.9	1.5	0.6
Students	0.3	0.4	0.5	0.7	0.6	0.3
Parents or other community members	1.5	1.4	1.4	0.9	1.2	0.4
Other	0.4	0.4	0.4	0.4	0.4	0.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.

Table 8.--Estimates and standard errors for the figures: Fall 1996

Figure	Estimate	Standard error
Figure 1: Percent of public schools with Internet access, by type of network connection: Fall 1996		
1994		
Modem	97	0.7
SLIP/PPP	3	0.6
T1	3	0.8
56Kb	4	0.7
ISDN	*	*
1996		
Modem	74	1.8
SLIP/PPP	20	1.9
T1	12	1.5
56Kb	11	1.6
ISDN	4	0.7
Figure 2: Percent of public schools with Internet access, by the number of instructional rooms with access: Fall 1996		
None	5	1.2
One	43	2.5
Two or three	22	1.9
Four	4	0.8
Five or more	25	2.0
Figure 3: Percent of all public schools having or expecting Internet access between fall 1996 and the year 2000		
Current access	65	1.8
Planned access		
1997	74	1.5
1998	89	1.1
1999	93	0.9
Year 2000	95	0.8

*Data not collected for 1994.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, "Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996," FRSS 61, 1996.